

## The natural history of angina in a general practice

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**SUMMARY.** An appreciation of the natural history of angina pectoris is important when deciding on the place of new and potentially dangerous forms of treatment. During 1950–1975, 268 patients with angina were diagnosed and followed up in my London general practice. The annual incidence, in adults over 40, was five per 1,000 and increased with age.

During the period of follow-up, half the patients died, an annual mortality of 4·6 per cent. However, among the survivors one third ceased to suffer anginal symptoms spontaneously and without specific therapy. Of those who continued to suffer from angina, in 71 per cent the condition was graded as minor, in 27 per cent as moderate, and in only two per cent were the attacks severe and disabling. Usually the angina was primary (77 per cent) and it was secondary, after myocardial infarction, in 23 per cent.

Of the 134 deaths, three quarters were from a cardiovascular cause. This group of angina patients had a 2:1 times greater observed, than expected, risk of dying (O/E ratio). The O/E mortality ratio fell progressively with age. It was highest in the 40–49 decade (4·0) and lowest in the over 80s, when the observed mortality rate was less than expected (0·9). The O/E mortality ratio was higher in men (2·3) than in women (1·7).

From this survey I conclude that angina does not have a uniformly bad prognosis, and that with the advent of beta-adrenergic blockers, the proportion considered for angiocardiology and aorto-coronary bypass grafting should be less than five per cent of all patients with angina.

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### Introduction

Angina pectoris is an old disease in a new setting. Since Heberden's description 200 years ago there has been considerable uncertainty about its course and prognosis and the benefits of treatment. Until recently therapy was limited to the judicious use of glyceryl trinitrate. Now there are two new dramatic advances, the beta-adrenergic blocking drugs and aorto-coronary bypass grafting for blocked coronary arteries.

With a condition as unpredictable as angina it is particularly necessary to know the natural history as a base-line in order to select with sense and discrimination cases suitable for surgery. The risks of bypass grafting are appreciable, with a minimal operative mortality of five per cent and even with coronary arteriography the mortality varies from 0·1 per cent to more than two per cent (Jackson *et al.*, 1975).

The experience of hospital specialists of the natural history of angina is unrepresentative because of inevitable selection. A truer picture can be drawn from careful recording and follow-up in a general practice over long periods of time.

### Method

The general practice from which these data have been collected, is in middle-class suburban, South-east London. The mean population during the 25-year period under review (1950–75) was 6,155. All those with angina pectoris were recorded and followed up prospectively. Those reviewed were observed for at least five years. I excluded those who moved away (30 out of 298).

The criteria for diagnosis were: recurrent, substernal distress associated with exertion or excitement and relieved by rest or glyceryl trinitrate and where no other cause, such as hiatus hernia, or chronic airways obstruction, was considered likely.

Electrocardiography, blood investigations, and chest radiography were not carried out routinely in every case, but a clinical examination including measurement of blood pressure was performed. Note was taken of related factors and events such as development of proven myocardial infarction, heart failure, or associated conditions such as anaemia, intermittent claudication, diabetes, and hypertension. Autopsy reports were available on all sudden deaths. During this period none of those followed up have had any aorto-coronary bypass grafts and only 11 have been treated with beta-adrenergic blocking drugs.

### Results

During a 25-year period (1950–1975) 268 people were diagnosed as suffering from angina pectoris. Of these 30 moved away and were lost for follow-up. The observations are on 268 patients (172 men and 96 women) who survived for more than five years or who died at any time after the diagnosis had been made.

TABLE 1  
NUMBER OF YEARS OF OBSERVATIONS

<i>Years of follow-up</i>	<i>0–4</i>	<i>5–9</i>	<i>10–14</i>	<i>15–19</i>	<i>20 and over</i>
<i>Number of patients</i>	25	38	32	10	4

### Incidence

The incidence during the 20-year period for a mean population at risk of 40 years and older of 2,755 is shown in table 2. The incidence was more than twice as great in men as in women and it increased with age in both sexes. However, the relative fall in the over 70s should be noted as a similar pattern has been found with hypertension (Fry, 1974a). Among associated clinical features were anaemia, a bleeding peptic ulcer or pernicious anaemia in nine, diabetes in seven, and intermittent claudication in six. Three men with angina on walking had no angina when they cycled.

TABLE 2  
NUMBER OF NEW PATIENTS WITH ANGINA PER YEAR PER THOUSAND AT RISK

<i>Age</i>	<i>40–49</i>	<i>50–59</i>	<i>60–69</i>	<i>70 and over</i>	<i>All adults</i>	<i>Numbers</i>
<i>Males</i>	76	135	210	201	137	172
<i>Females</i>	14	51	131	104	64	96
<i>Total</i>	43	91	171	140	97	268

### Outcome

During the period of follow-up, half died. This represents an annual mortality rate of 4.6 per cent (since the mean period of follow-up was 11 years). However, this was a relatively elderly group; 20 per cent (56) were over 70 and 56 per cent (150) were over 60 at the time of diagnosis. Table 3 also shows that 18 per cent ceased spontaneously to suffer symptoms, another 25 per cent continued with their angina and a further seven per cent developed complications. The complications in survivors noted were almost

equally distributed between congestive cardiac failure (12 people) and myocardial infarction (eight people).

TABLE 3  
OUTCOME IN 268 PATIENTS WITH ANGINA

	<i>Angina goes</i>		<i>Angina persists</i>		<i>Complications</i>		<i>Deaths</i>		<i>Totals</i>	
	<i>Num-ber</i>	<i>Per-cent</i>	<i>Num-ber</i>	<i>Per-cent</i>	<i>Num-ber</i>	<i>Per-cent</i>	<i>Num-ber</i>	<i>Per-cent</i>	<i>Num-ber</i>	<i>Per-cent</i>
Males	26	15	39	23	11	6	96	56	172	100
Females	21	21	28	30	9	9	38	40	96	100
People	47	18	67	25	20	7	134	50	268	100

### *Severity*

The severity of the persisting angina in survivors was graded. It was severe and enough to cause considerable difficulty on any exertion in only one man. It was moderate, requiring regular daily administration of glyceryl trinitrate, in 27 per cent of all those with persisting angina (18 out of 67), and minor requiring none or only occasional glyceryl trinitrate tablets in 71 per cent (48 out of 67).

The great majority, 77 per cent (215) of all the anginas were primary, that is, they were the first presenting symptom of coronary artery disease. In 23 per cent (53) anginal symptoms first developed after a known myocardial infarction. The proportions were different in the two sexes. In men the angina was primary in 69 per cent (130 out of 172) and in women in 90 per cent (85 out of 96).

### *Deaths*

One half (134) of all those followed-up died. Three quarters of deaths were from cardiovascular causes. In men the proportion was 78 per cent and in women 73 per cent.

The degree of extra risk facing these angina patients were calculated by comparing the observed to expected mortality rates. The expected rates were from the abridged life tables for England and Wales published by the Office of Population Censuses and Surveys for 1971. Table 4 shows the findings.

There was a total two-fold (2.1) extra risk to life in this group of angina patients. The risks (O/E rates) were greater in men (2.3) than in women (1.7) and were greater in the younger age groups, falling progressively from a four-fold extra risk in the 40-49 age group to a less than expected risk in the 80s (0.9).

TABLE 4  
OBSERVED MORTALITY RATES FOR ANGINA PATIENTS COMPARED WITH THOSE EXPECTED IN ENGLAND AND WALES (O/E RATES)

<i>Age group</i>	<i>40-49</i>	<i>50-59</i>	<i>60-69</i>	<i>70-79</i>	<i>80+</i>	<i>All adults</i>
Males	4.2	2.4	2.2	1.9	0.8	2.3
Females	3.2	2.0	1.4	1.3	1.1	1.7
Total	4.0	2.3	1.9	1.6	0.9	2.1

### **Discussion**

Angina pectoris accounts for about one third of all presenting clinical coronary heart disease (Fry, 1974b). In my practice it is relatively more frequent in women than in

men and the Framingham experience has been the same (Kannel and Feinleib, (1972) It is not as dramatic in its presentation as an acute myocardial infarction or sudden death, but its outlook is not much less serious than that of myocardial infarction. The observed mortality in both angina and infarction have been similar in my practice, over twice that expected in both of these conditions. Here again the Framingham experience is the same.

Another way of recording the natural history of angina has been to measure the annual mortality rate during a long period of follow-up. The total annual mortality rates reported have ranged from about two per cent for "low risk cases" (Russek, 1972) to over five per cent (Richards *et al.*, 1956). In Paul White's 25-year follow-up of 456 patients, to almost ten per cent from the Mayo Clinic (Block *et al.*, 1952). In this series it was 4.5 per cent, but there were proportionately more elderly patients.

Recently prognosis in coronary artery disease has been related to angiographic findings, the number, site, and severity of obstructions of the coronary arteries. Similar findings from a number of reports show close correlation between prognosis and the number and site of the coronary arteries obstructed (Bruschke *et al.*, 1973; Webster *et al.*, 1974; Reeves *et al.*, 1974). If all three major coronary arteries are obstructed the annual mortality will be about 15 per cent, with two major arteries it will be about ten per cent and with a single major artery about five per cent. It has also been shown that up to a quarter of those with clinical angina have normal non-obstructed coronary arteries and a good prognosis (*British Medical Journal*, 1974).

The practical questions and dilemmas are; which patients with angina should be considered for aorto-coronary bypass grafting? Clinically, a balance must be made between the natural history and the risks of the investigations and the surgical operation. The outlook is worse in younger patients and in men more so than in women.

A reasonable approach is to progress through general advice on life habits and use of glyceryl trinitrate and if the symptoms are not controlled to go on to one of the beta-adrenergic blocking drugs.

If symptoms still persist and are troublesome, then the patient should be referred for angiography and possible grafting. Such a compromise would not only be reasonable on practical clinical grounds, but also would make the numbers to be investigated and operated manageable. Thus, a British general practitioner may expect to see about five new cases of angina each year. This means that there will be 500 new cases in the orbit of a large district hospital serving a quarter of a million people and 2,000 or more in a region of a million people served by a regional cardiac surgical unit. With the conservative selection suggested the numbers reaching the regional unit for evaluation would be approximately 50-100 a year.

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